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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ERIC W. BROWN, ANNI R. CODEN, JOHN M. PRAGER,
DRAGOMIR R. RADEN and VALERIE SAMN

Appeal 2007-3094
Application 09/713,075
Technology Center 2600

Decided: February 27, 2008

Before KENNETH W. HAIRSTON, JOHN A. JEFFERY and MARC S. HOFF, *Administrative Patent Judges*.

HAIRSTON, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants seek our review under 35 U.S.C. § 134 of the Examiner's twice rejected claims 1-12. We have jurisdiction under 35 U.S.C. § 6(b).

SUMMARY OF DECISION

We affirm.

INVENTION

Appellants' claimed invention is to an automated question answering method, system, and computer program product that provides precise answers to factual natural language questions (Spec. 5:18-19). The input to the system is a set of one or more natural language questions and a collection of textual documents retrieved by an informational retrieval system or a search engine (Spec. 5:18-19). A feature extraction module computes a set of features from the input textual documents and the natural language questions (Spec. 5:24-26). A feature combination technique uses either a statistical logistic regression or a manually specified function to determine the best formula to combine the different features (Spec. 7:18-25). A composite score is computed to classify potential answers into more or less likely ones (Spec. 8:4-7). The output is a set of ranked factual answers extracted from the document selection, and it is presented with context from the passage containing the answer (Spec. 8:27-30).

Claims 1, 5, 7, 9, and 12 reproduced below, are representative of the subject matter on appeal.

1. A method for selecting answers to natural language questions from a collection of textual documents comprising the steps of:

extracting scoring features from a candidate list of passages of possible answers;

scoring the possible answers using the extracted features and a feature scoring function; and

presenting the best scoring possible answer to the user with context from the passage containing the answer.

5. A method as in claim 3, wherein the parameters of the scoring function are learned by a machine learning algorithm.

7. A computer system that extracts answers to natural language questions from a large collection of textual documents consisting of one or more of the following modules:

a feature extraction module;

a feature combination module, containing a "feature extraction" and "compute composite score" components;

an answer selection module; and

an answer presentation module.

9. A computer system as in claim 7, wherein the feature combination module employs a feature scoring function with parameters learned by a machine learning method.

12. A computer program product that performs the steps of:

determining a feature scoring function during a training phase either manually or via a machine learning algorithm applied to a set of training questions, corresponding answer passages, and certain extracted features; and

during an execution phase, extracting certain features from questions and corresponding possible answer phrases, applying the feature scoring function determined during the training phase to score each possible answers phrase, selecting one or more of the best scoring answer phrases, and displaying the answer phrases to the user with optional additional context from the answer passages.

THE REJECTION

The Examiner relies upon the following as evidence of unpatentability:

Kupiec	US 5,696,962	Dec. 09, 1997
Braden-Harder	US 5,933,822	Aug. 03, 1999

The following rejections are before us for review:

1. Claims 1-4, 6-8, 10, and 11 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kupiec.

2. Claims 5, 9, and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kupiec in view of Braden-Harder.

ANTICIPATION UNDER § 102(b)

FINDINGS OF FACT

The relevant facts include the following:

1. Appellants' specification defines "answers" as "snippets of text (e.g. phrases) which provide the exact answer to the question" (Spec. 1:21-23).
2. Kupiec discloses a two-phase procedure wherein during the first phase, the primary articles are retrieved, and during the second phase, answer extraction is applied to the retrieved articles (col. 3, ll. 15-19).
3. Kupiec discloses that during the first phase, the relevant retrieved articles are heuristically scored according to the degree and number of matches with the phrases of the input question (col. 31, ll. 34-36).
4. Kupiec discloses that the retrieved articles from the first phase are ranked according to their score and a subset of these, called primary documents,

which contain the answer to the user's question, are made available for the second phase processing (col. 31, ll. 40-44).

5. Kupiec defines "answer" as the actual, correct answer to a given question (col. 3, l. 33).
6. Kupiec defines "answer hypothesis" as a guess at the correct answer to a question (col. 3, ll. 34-35).
7. Kupiec discloses that during the second phase each answer hypothesis is determined by answer extraction by finding all simple noun phrases contained in the match sentences which are the sentences that caused the primary articles to be retrieved (col. 31, ll. 52-55).
8. Kupiec discloses that the match sentences correspond to one or more phrases of the input question, and each noun phrase found becomes an answer hypothesis distinguished by its component words, the article and match sentence in which it occurs (col. 31, ll. 55-59).
9. Kupiec discloses that the system further verifies phrase relations such as verification of the feature extraction describing the "type" of the phrase (col. 31, l. 65-col. 32, l. 7).
10. Kupiec discloses that the answer hypotheses are scored on a per-article basis, according to the sum of the scores of the articles in which they occur (col. 31, ll. 60-63).
11. Appellants' disclosure teaches scoring the passage relevance (409) (i.e., scoring of the article) and using it as an extracted feature which becomes part of the composite score to determine the best scoring possible answer (Spec. 7:13 and Figure 9).

12. Kupiec discloses presenting the best matching phrase/scoring possible answer to the user indicated as "Mailer, Norman" as well as context from the passages of relevant texts containing this answer as indicated by the relevant text of two articles (col. 32, ll. 37-67 and Table 8).
13. Kupiec's Table 8 provides the snippet answer with the associated description of: "The best matching phrase for this question is: Mailer, Norman;" which is the answer to the natural language question of: "Who was the Pulitzer Prize-winning novelist that ran for mayor of New York City?" (Tables 7 and 8).
14. Kupiec discloses that a query is performed to determine if the answer hypothesis is present as an article title (col. 36, ll. 44-64).

PRINCIPLES OF LAW

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. Inc., v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).

Analysis of whether a claim is patentable over the prior art under 35 U.S.C. § 102 begins with a determination of the scope of the claim. We determine the scope of the claims in patent applications not solely on the basis of the claim language, but upon giving claims their broadest reasonable construction in light of the specification as it would be interpreted by one of ordinary skill in the art. *In re American Academy of Science Tech Center*, 367 F.3d 1359, 1364 (Fed. Cir. 2004).

The claims, of course, do not stand alone. Rather, they are part of a

> 'fully integrated written instrument' . . . consisting principally of a specification that concludes with the claims. For that reason, claims 'must be read in view of the specification, of which they are a part.' . . . . [T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'

Phillips v. AWH Corp., 415 F.3d 1303, 1315 (Fed. Cir. 2005).

The transitional term "comprising" is inclusive or open-ended and does not exclude additional, unrecited elements. *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997).

ANALYSIS

Claims 1-4, 6-8, 10, and 11 were argued as a group with claims 1 and 7 as representative (App. Br. 3-5). Appellants argue that Kupiec discloses that answer scores are based on article scores, which do not constitute scoring features of "possible answers" as required by claims 1 and 7 (App. Br. 4). Appellants' specification defines "answers" as "snippets of text" providing an exact answer to a question, and, thus, articles as disclosed by Kupiec do not qualify as answers (App. Br. 4 and Finding of Fact 1). The Examiner replies that Kupiec discloses "answer hypotheses" determined by answer extraction based on finding simple noun phrases (features) contained in match sentences (features of possible answers or snippets, not documents) of the articles (Ans. 10). The Examiner asserts that while the article has a score, so does the answer hypothesis based on scoring features of possible answers (Ans. 11).

Kupiec discloses a two-phase procedure wherein during the first phase, the

primary articles are retrieved, and during the second phase, answer extraction is applied to the retrieved articles (Finding of Fact 2). During the first phase, the relevant retrieved articles are heuristically scored according to the degree and number of matches with the phrases of the input question (Finding of Fact 3). These articles are ranked according to their score and a subset of these, called primary documents, which contain the answer to the user's question, are made available for the second phase processing (Finding of Fact 4). Kupiec defines "answer" as the actual, correct answer to a given question (Finding of Fact 5) and "answer hypothesis" as a guess at the correct answer to a question (Finding of Fact 6).

Kupiec further discloses that during the second phase each answer hypothesis is determined by answer extraction by finding all simple noun phrases contained in the match sentences which are the sentences that caused the primary articles to be retrieved (Finding of Fact 7). The match sentences correspond to one or more phrases of the input question, and each noun phrase found becomes an answer hypothesis distinguished by its component words, the article and match sentence in which it occurs (Finding of Fact 8). The system further verifies phrase relations such as verification of the feature extraction describing the "type" of the phrase (Finding of Fact 9). The answer hypotheses are scored on a per-article basis, according to the sum of the scores of the articles in which they occur which is the feature scoring function (Finding of Fact 10).

Thus, Kupiec teaches that during phase two the answer hypotheses/possible answers are scored using the extracted features and that this scoring is in addition to the heuristically based scoring of the articles occurring during phase one. As

stated *supra*, the transitional open-ended term "comprising" does not exclude additional, unrecited elements (i.e., the heuristically based scoring of the articles). *Genentech, Inc. v. Chiron Corp.*, 112 F.3d at 501.

Therefore, we are not persuaded by Appellants' argument that Kupiec discloses that answer scores are based on article scores, which do not constitute scoring features of "possible answers" as required by claims 1 and 7, as Kupiec teaches, in addition to the scoring of the articles, the scoring of features of "possible answers" (Findings of Fact 6-10).

Furthermore, as previously stated, the specification is always highly relevant to the claim construction analysis and it is usually dispositive; it is the single best guide to the meaning of a disputed term. *Phillips v. AWH Corp.*, 415 F.3d at 1315. Since the disputed terms are "scoring the possible answers using the extracted features," or "a feature combination module, containing a 'feature extraction' and 'compute composite score'" as claimed in claims 1 and 7, respectively, the specification's disclosure of scoring the passage relevance (409) (i.e., scoring of the article) and using it as an extracted feature which becomes part of the composite score to determine the best scoring possible answer (Finding of Fact 11) supports the interpretation of scoring the articles and factoring this article score into the composite score of the possible answer. Consistent with this determination, Kupiec factors into the score of answer hypotheses/possible answers the scoring of the articles (Finding of Fact 10).

For the foregoing reasons, we are not persuaded by Appellants' argument that Kupiec's answer scores are based on article scores, which do

not constitute scoring features of "possible answers" as required by claims 1 and 7, because the scoring of the answer hypothesis/possible answer which occurs in phase two is in addition to the scoring of the articles occurring in phase one and, thus, the scored articles are factored into the composite score, which is consistent with Appellants' passage relevance scoring (i.e., scoring of the article) being factored into the composite score of the possible answer (Findings of Fact 10-11).

Furthermore, the Examiner finds that Kupiec provides a snippet answer as indicated in Table 8 by the answer: "Mailer, Norman" (Ans. 10). Appellants argue that "Mailer, Norman" as it appears in Kupiec's Table 8 actually refers to the title of the document, and any explicit answer to the question as presented in Kupiec's Table 7 is coincidental (Reply Br. 2). The Appellants further argue that if "Mailer, Norman" was the answer discovered in the text, a person of ordinary skill in the art would expect the answer to be "Norman Mailer" which is how the cited name appears in the second relevant text passage of Table 8 (Reply Br. 2).

Kupiec discloses presenting the best matching phrase/scoring possible answer to the user indicated as "Mailer, Norman" as well as context from the passages of relevant texts containing this answer as indicated by the relevant text of two articles (Finding of Fact 12). Table 8 provides the snippet answer with the associated description of: "The best matching phrase for this question is: Mailer, Norman;" which is the answer to the natural language question of: "Who was the Pulitzer Prize-winning novelist that ran for mayor of New York City?" (Finding of Fact 13). Thus, the qualifying answer which describes "Mailer, Norman" as the best matching phrase to the question is not coincidental and, while it also happens

to be the title of the first displayed document, titles of documents can also constitute answers or snippets. This conclusion is further supported by Kupiec, which states that a query is performed to determine if the answer hypothesis is present as an article title (Finding of Fact 14).

Thus, we are not persuaded by Appellants' argument that Kupiec does not disclose presenting the best scoring possible answer to the user as well as context from the passages of relevant texts containing the answer.

OBVIOUSNESS

FINDINGS OF FACT

The relevant facts include the following:

1. Braden-Harder teaches scoring each possible answer phrase, selecting one or more of the best scoring answer phrases, and displaying the answer phrases to the user as required by independent claim 12 (col. 17, l. 16-col. 18, l. 24 and Figures 8A and 8B).
2. Braden-Harder teaches a learning mechanism based upon learned experiences in a machine learned environment, i.e. neural network (col. 25, ll. 41-48).

PRINCIPLES OF LAW

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734 (2007). The question of

obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 127 S.Ct. at 1734 ("While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.")

The Examiner bears the initial burden of presenting a prima facie case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). If that burden is met, then the burden shifts to the Appellant to overcome the prima facie case with argument and/or evidence. (*See id.*)

The Examiner's articulated reasoning in the rejection must possess a rational underpinning to support the legal conclusion of obviousness. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). The Supreme Court, citing *In re Kahn*, 441 F.3d at 988, stated that "rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007). However, "the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *Id.*

One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). The test of obviousness is what the combined

teachings would have suggested to those of ordinary skill in the art. *Id.*

ANALYSIS

A. Rejection of claim 12 under 35 U.S.C. § 103(a) as unpatentable over Kupiec in view of Braden-Harder.

Appellants argue that the secondary reference of Braden-Harder does not teach scoring the possible answers using the extracted features and a feature scoring function and presenting answers with context from a relevant passage (App. Br. 5). However, these are features that were taught by the primary reference of Kubiec as discussed above and, as stated *supra,* one cannot show nonobviousness by attacking references individually where the rejections were based on combinations of references. *In re Keller*, 642 F.2d at 425.

Appellants further argue that Braden-Harder does not teach scoring each possible answer phrase, selecting one or more of the best scoring answer phrases, and displaying the answer phrases to the user as required by independent claim 12 (App. Br. 5). However, Braden-Harden does teach these limitations of claim 12, as shown in Figures 8A and 8B (Finding of Fact 1). Thus, we are not persuaded by Appellants' argument that Braden-Harder does not teach these disputed limitations of claim 12, and the Examiner did not err in rejecting claim 12 as being unpatentable over Kupiec in view of Braden-Harder.

B. Rejection of claims 5 and 9 under 35 U.S.C. § 103(a) as unpatentable over Kupiec in view of Braden-Harder.

Appellants further argue with respect to claims 5 and 9 that Braden-Harder does not teach that "the parameters of the scoring function are learned by a

machine learning algorithm" (App. Br. 5). The Examiner found that Braden-Harder discusses the parameters and weighing scheme that define the scoring (Ans. 12). Furthermore, the Examiner determined that Braden-Harder teaches a learning mechanism based upon learned experiences in a machine learned environment, i.e. neural network (Ans. 12 and Finding of Fact 2). We fully agree with the Examiner's findings of facts and legal conclusion of obviousness as set out in the Answer and adopt them as our own.

Thus, we are not persuaded by Appellants' argument that Braden-Harder does not teach that "the parameters of the scoring function are learned by a machine learning algorithm."

CONCLUSIONS OF LAW

We conclude that the Appellants have not shown that the Examiner erred in rejecting claims 1-4, 6-8, 10, and 11 under 35 U.S.C. § 102(b), and in rejecting claims 5, 9, and 12 under 35 U.S.C. § 103(a).

DECISION

The decision of the Examiner to reject claims 1-12 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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